ISSN (print) 0093-4666 © 2012. Mycotaxon, Ltd. ISSN (online) 2154-8889

MYCOTAXON

http://dx.doi.org/10.5248/120.223

Volume 120, pp. 223–230 *April–June 2012*

Coriolopsis psila comb. nov. (*Agaricomycetes*) and two new *Coriolopsis* records for Brazil

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Abstract — The new combination *Coriolopsis psila* is proposed and *C. brunneoleuca* and *C. hostmannii* are reported as new to Brazil. Descriptions of these collections and a key to the eight accepted *Coriolopsis* species reported from Brazil are provided.

Key words — *Polyporaceae*, diversity, *C. byrsina, C. caperata, C. floccosa*

Introduction

Coriolopsis Murrill (Murrill 1905) comprises about 17 valid species (Kirk et al. 2008). The genus is cosmopolitan, although several species are restricted to the temperate or tropical zones (Ryvarden & Johansen 1980, Ryvarden & Gilbertson 1993, Núñez & Ryvarden 2001, Dai 2011, Dai et al. 2011). It is characterized by the annual (rarely perennial) pileate or sessile (rarely resupinate) basidiomata with great color variation. The hyphal system is trimitic with clamp connections on generative hyphae, cystidia are absent, and basidiospores are cylindrical, smooth, thin-walled, non-amyloid, oblong–ellipsoid, and hyaline to pale brown (Ryvarden & Johansen 1980, Ryvarden 1991, Ryvarden & Gilbertson 1993).

Only seven *Coriolopsis* species have previously been reported from Brazil: *C. aspera* (Jungh.) Teng, *C. badia* (Berk.) Murrill, *C. burchellii* (Berk. ex Cooke) Ryvarden, *C. byrsina*, *C. caperata*, *C. floccosa*, and *C. gallica* (Fr.) Ryvarden (Ryvarden 1988, Gugliotta & Abrahão 2011).

To increase the knowledge of polypore diversity in Brazil, we record two additional species, propose a new combination, and provide identification keys to all known Brazilian species.

Material & methods

In the Brazilian Amazonia, field trips were undertaken in Pará State from July 2006 to February 2008 in the Floresta Nacional de Caxiuanã (1°42′3″S 51°31′45″W) and in Rondônia State from 2007 to 2008 in the Estação Ecológica de Cuniã (8°04′S 63°31′W) and Parque Natural Municipal de Porto Velho (8°45′S 63°54′W). In Pernambuco State, Brazilian mangroves were surveyed from March 2009 to March 2010 in Maria Farinha (7°51′24.8″S 34°50′32.7″W), Itamaracá (7°46′52.6″S 34°52′53.3″W), Maracaípe (8°32′22.8″S 35°00′29.1″W), and Rio Formoso (8°41′20.8″S 35°06′06.6″W).

Both recent collections and specimens deposited in INPA, O, RB, and SP were studied. Specimens were analyzed macro- (shape, color, hymenial surface) and micromorphologically (hyphal system, presence/absence and measurements of sterile structures and basidiospores). Slides were prepared with 5% KOH (stained with 1% aqueous phloxine) or Melzer's reagent (Ryvarden 1991). Color designation followed Watling (1969). The material was incorporated to HFSL, MG, O, and URM.

Results & discussion

After identification of new collections and revision of herbaria, eight *Coriolopsis* species are reported for Brazil. The presence of *C. gallica* is not confirmed, as previous reports actually represent *Hexagonia hydnoides* (Sw.) M. Fidalgo (Tavares 1939, URM 608/IPA 281) or *Trametes* sp. (Bononi et al. 1984, SP 156751). *Coriolopsis badia* is a dubious species because it is considered a synonym of either *Phellinus badius* (Cooke) G. Cunn. (http://www.cbs.knaw.nl, http://www.mycobank.org) or *C. aspera* (Ryvarden & Johansen, 1980). The only record of *C. badia* in Brazil (Gibertoni et al. 2004, URM 77849) represents a *Trametes* sp.

Coriolopsis brunneoleuca and *C. hostmannii* are new occurrences for the country. *Coriolopsis psila,* here transferred from *Fomes,* is probably a new occurrence for the Brazilian Amazonia. *Coriolopsis byrsina* represents a new record for the states of Amazonas, Rondônia, and Roraima, *C. caperata* for Amazonas, and *C. floccosa* for Acre, Amazonas, and Mato Grosso. These new occurrences were studied also from collections deposited in INPA, RB and SP, underscoring the importance of herbarium revisions and accessibility of herbaria records to the knowledge of fungal diversity.

Coriolopsis brunneoleuca (Berk.) Ryvarden, Norw. Jl Bot. 19: 230 (1972).

Basidiomata annual, effused-reflexed, gregarious, coriaceous, ≤ 5.5 cm, 1.5 cm wide and to 1 mm thick. Abhymenial surface tomentose, dull, cigar brown (16) to fuscous black (36) with concentric zones of dark color. Margin entire, acute, concolorous with the abhymenial surface. Context homogeneous, fibrous, ≤ 100 µm thick, milky coffee (28) to cinnamon (10). Hymenial surface with pores angular, 2–3 per mm, dissepiments 50–100 µm thick, snuff brown (17) to clay buff (32). Hyphal system trimitic; generative hyphae hyaline, branched, clamped, thin-walled, 1.5–2.5 µm diam.; skeletal hyphae yellowish to

pale brown, thick-walled, 4–7.5 µm diam., dextrinoid; binding hyphae golden-yellow, almost solid, 3–5 µm diam. Cystidia absent. Basidia not observed. Basidiospores cylindrical, hyaline, thin-walled, smooth, inamyloid, 7–11 × 3–4 µm.

Ecology & Distribution: On deciduous wood. According to Ryvarden & Johansen (1980), the species is pantropical. It is new to Brazil.

Specimens examined: **BRAZIL**. **Pará**, Floresta Nacional de Caxiuanã, VIII.2007, leg. P.S Medeiros et al. PS122, PS226, PS342 (MG195152, MG195155, MG195182).

Remarks: A cigar brown to fuscous black pileus surface, rather large shallow pores, and broad dextrinoid skeletal hyphae characterize the species.

Coriolopsis byrsina (Mont.) Ryvarden, Norw. Jl Bot. 19: 230 (1972).

Description: This species is characterized by small pores, soft rusty-brown basidiomata, and ellipsoid to sub-cylindrical basidiospores, 9–14 × 4.5–5 µm. For further details see Ryvarden & Johansen (1980).

Ecology & Distribution: On deciduous wood. In tropical Africa, America, and Asia (Ryvarden & Johansen 1980; Dai 2011). In Brazil, previously known from the states of Acre, Mato Grosso, Rio Grande do Sul, and São Paulo (Gugliotta & Abrahão 2011); newly reported from Amazonas, Rondônia, and Roraima.

Specimens examined: **BRAZIL**. **Acre**: Rio Branco, 24.IX.1980, leg. B. Lowy et al. 241 (INPA 183806); **Amazonas**: Presidente Figueiredo, 18.I.1983, leg. M.A Jesus 123 (INPA 183806); **Mato Grosso**: Aripuanã, 23.IV.1978, leg. M.A. Sousa 427 (INPA 75606); **Rondônia**: Jarú, Reserva Biológica de Jarú, 13.V.1987, leg. M. Capelari et al. (SP 211995); location not determined, 4.VII.1968, leg. K.P. Dumont et al. 143 (INPA 65179); 3.II.1984, leg. G.J. Samuels 55 (INPA 129095); **Roraima**: locality unknown, 1.XII.1977, leg. I.J. Araújo et al. 757 (INPA 78476); **São Paulo**: Itaicy, 06.VII.1957, leg. not determined (URM 7880, as *Polystictus byrsinus*).

Coriolopsis caperata (Berk.) Murrill, N. Amer. Fl. 9(2): 77 (1908).

Description: *Coriolopsis caperata* is characterized by effused-reflexed to pileate darkly colored basidiomata and a zonate abhymenial surface in different shades of brown. For further details see Ryvarden & Johansen (1980).

Ecology & Distribution: On deciduous wood. Tropical Africa and America (Ryvarden & Johansen 1980). In Brazil, it is reported for the states of Acre, Alagoas, Amapá, Bahia, Espírito Santo, Mato Grosso, Minas Gerais, Pará, Paraíba, Paraná, Pernambuco, Rio Grande do Norte, Rondônia, Roraima, Rio de Janeiro, Rio Grande do Sul, Santa Catarina, São Paulo, Sergipe (Baltazar & Gibertoni 2009, Gugliotta & Abrahão 2011), and now for Amazonas State.

Specimens examined: **BRAZIL**: **Acre**: Sena Madureira, 27.IX.1968, leg. G. T. Prance et al. 7595 (INPA 24394); **Amazonas**: Barcelos, II.1984, leg. G. J. Samuels 72 (INPA 129121); Borba, 6.V.1985, leg. K.F. Rodrigues et al. 490 (INPA 129022, as *Coriolus versicolor*); Manaus, 1.V.1977, leg. M. A. Souza 149 (INPA 74657, as *Coriolopsis polyzona*); 6.X.1985, leg. K.F. Rodrigues et al. 800 (INPA 137086); 5.X.1927, leg. P. Occhioni (SP 25530); 23.XII.1983, leg. G. Guzman et al. (SP 193577); Manicoré, IV.1985, leg. K.F. Rodrigues et al. 91 (INPA 128914, as *Coriolopsis* sp); Nova Aripuanã, 29.IV.1985, leg.

K.F. Rodrigues et al. 410, 389 (INPA 129009, as *C. polyzona*, INPA 129005, as *Polyporus* sp.); Tapuruquara, 22.I.1978, leg. I. J. Araújo et al. 973 (INPA 78745, as *Hexagonia* sp.); Tefé, 11.VII.1973, leg. E. Lleras et al. 16611 (INPA 39800); Cachoeira de Tarumã, 5.X.1927, leg. P. Occhioni (RB 217241); Serra de Araçá, 29.II.1984, leg. G. J. Samuels (RB 24785); Manicoré, Estrada do Estanho, 20.IV.1985, leg. K.F. Rodrigues (RB 238166); Novo Aripuanã, Vila do Apuy, 29.IV.1985, leg. K.F. Rodrigues et al. (RB 238334); Distrito Agropecuário da Suframa, 03.X.1985, leg. N. Rodrigues et al. (RB 237012, RB 240587); **Pará**: Belém, 13.IX.1968, leg. B. Santiago (SP 106707); 3.VI.1980, leg. V. L. Bononi (SP 177467); Melgaço, VIII.2007, leg. T. B. Gibertoni (URM 79656 on *Xylopia* sp.; URM 79653 on *Pouteria* sp.; URM 79650 on *Nectandra* sp.; URM 79649 on *Licania* sp.; URM 79646 on *Parkia* sp.; URM 79647 on *Sclerolobium* sp.; URM 79648 on *Eschweilera* sp.; URM 79652 on *Dinizia excelsa*); Redenção, 20.VIII.1984, leg. N. Rodrigues (RB 224462); Oriximiná, 28.VI.1980, leg. V.L. R. Bononi et al. 638, 241 (INPA 103609, as *Coriolus* sp., INPA 103335, as *Trametes pinsita*); Itaituba, IX.1977, leg. M.A. Sousa et al. 25 (INPA 74631, as *Hexagonia caperata*); **Pernambuco**: Escada, 26.X.1954, leg. not determined (URM 1010, as *Polystictus occidentalis*); Recife, 24.VII.1957, leg. not determined (URM 12468, as *P. caperatus*); Tapera, 1932, leg. not determined (URM 762, as *P. caperatus*); **Rondônia**: Caracaraí, 3.VII.1968, leg. G.T. Prance et al. 5497 (INPA 22257); Campo Novo, X.1979, leg. R.H. Petersen 155 (INPA 110517, as *Polyporus* sp.); Jarú, 2.X.1986, leg. M. Capelari & R. Maziero (SP 211273); Vilhena, X.1979, leg. R. H. Petersen 218 (INPA 110706, as *Polyporus* sp.); Porto Velho, Estação Ecológica de Cuniã, II.2007, leg. A. C. Gomes-Silva 33 (URM 78898); II.2008, leg. A. C. Gomes-Silva 222 (URM 78906); 11.III.2010, leg. A.C. Gomes-Silva et al. 815 (URM 82837); Parque Natural Municipal de Porto Velho, VII.2007, leg. A. C. Gomes-Silva 59 (URM 78900); VII.2008, leg. A.C. Gomes-Silva 603 (URM 79552); 20.VI.2009, leg. A.C. Gomes-Silva et al. 738 (URM 82833); 29.I.2010, leg. A.C. Gomes-Silva et al. 941 (URM 82831); 3.II.2011, leg. A.C. Gomes-Silva et al. 1089 (URM 82903); Fazenda Mucuim, VII.2007, leg. A.C. Gomes-Silva 91 (URM 78901); **Roraima**: Alto Alegre, 21.VI.1986, leg. K.F. Rodrigues et al. 1083 (INPA 143425); Caracaraí, 16.XI.1977, leg. I .J. Araújo et al. 438 (INPA 76933, as *Hexagona* sp.).

Coriolopsis floccosa (Jungh.) Ryvarden, Norw. Jl Bot. 19(3–4): 230 (1972).

Description: The umber brown tomentose to hirsute or even velutine pileus surface and fairly large pores are diagnostic for this species. For further details see Ryvarden & Johansen (1980).

Ecology & Distribution: On deciduous wood. Pantropical (Ryvarden & Johansen 1980). In Brazil, reported for the states of Alagoas, Bahia, Pará, Paraíba, Paraná, Pernambuco, Rio Grande do Sul, Rondônia, Roraima, Santa Catarina and São Paulo (Gugliotta & Abrahão 2011). Newly recorded for Acre, Amazonas, and Mato Grosso.

Specimens examined: **BRAZIL**: **Acre**: location not determined, 3.X.1980, leg. B. Lowy et al. 1069 (INPA 100886, as *Polyporus* sp.); **Amazonas**: Manaus, 10.X.1989, leg. R. Carvalho 1332 (INPA 192503, as *Coriolopsis* sp.); 21.VI.1985, leg. M. A. Jesus 755 (INPA 185984); 10.IX.1977, leg. M. A. Sousa & I. J. Araújo 219 (INPA 74661, as *Coriolus maximus*); Itacoatiara, 21.XII.1966, leg. G. T. Prance et al. 3778 (INPA 19403, as *Coriolopsis* sp.); 10.IX.1980, leg. B. Lowy et al. 129 (INPA 100040, as *Polyporus* sp.); **Bahia**: Conde, 08.II.1955, leg. A.C. Batista (URM 1242, as *Polystictus pinsitus*); Amaro, 23.V.1957, leg. not determined (URM 7450, as *Polystictus membranaceus*); **Mato**

Grosso: Aripuanã, 23.IV.1978, leg. M.A. Sousa et al. 431 (INPA 75610); Pará: Belém, 17.IV.1979, leg. I.J. Araújo 1239 (INPA 102851); Itaituba, 3.X.1977, leg. M.A. Sousa et al. 140 (INPA 74538, as *Coriolopsis* sp.); Pernambuco: Recife, 23.VII.1955, leg. not determined (URM 12498, as *P. membranaceus*); Rio Grande do Sul: São Leopoldo, 1932, leg. J. Rick (URM 9023, as *Polystictus rigens*); Roraima: Alto Alegre, 16.VI.1986, leg. E.S.S. Silva et al. 493 (INPA 154958); Boa Vista, 19.VII.1989, leg. M.A. Jesus 880 (INPA 186185, as *Coriolopsis* sp.); 1.XII.1977, leg. L.L.J. Aguiar et al. 750 (INPA 78469, as *Coriolopsis* sp.); 31.I.1984, leg. G.J. Samuels 39 (INPA 129089); Rondônia: Porto Velho, Estação Ecológica de Cuniã, VII.2007, leg. A.C. Gomes-Silva 204 (URM 78909); Parque Natural Municipal de Porto Velho, VII.2007, leg. A.C. Gomes-Silva 186 (URM 79477, as *Coriolopsis rigida*); Fazenda Mucuim, VII.2007, leg. A.C. Gomes-Silva 258 (URM 79478, as *C. rigida*).

Coriolopsis hostmannii (Berk.) Ryvarden, Syn. Fung. 23: 39 (2007).

Basidiomata perennial, sessile, hard and brittle when dry, dimidiate to flabelliform, solitary, projecting 2–4 cm, 3–5 cm wide and 0.5–1.5 mm thick. Abhymenial surface glabrous, dull to subshiny, zonate with brown and purple zones, hazel (27) to drab (33). Margin acute, concolorous with abhymenial surface. Context homogeneous, ≤ 0.5 mm thick, fulvous (12) to cigar brown (16). Tubes concolorous with context, ≤ 0.5 mm long. Hymenial surface with pores round, 6–7 per mm, dissepiments 50–100 µm thick, cigar brown (16). Hyphal system trimitic, generative hyphae hyaline, clamped, thin-walled, 1.5–2.5 µm diam.; skeletal hyphae yellowish to pale brown, thick-walled, 4–7.5 µm diam.; binding hyphae golden-yellow, almost solid, 3–5 µm diam. Cystidia absent. Basidia not observed. Basidiospores cylindrical, hyaline, thin-walled, inamyloid, 8–10 × 2.5–4.0 µm.

Ecology & Distribution: On deciduous wood. Neotropical, from Southern United States and south to Venezuela (Ryvarden & Johansen 1980). It is new to Brazil.

Specimens examined: **BRAZIL**. **Pernambuco**: Paulista, Manguezal de Maria Farinha, on dead *Rhizophora mangle*, 20.VIII.2009, leg. G.S. Nogueira-Melo et al. NM003 (URM 82147); on dead *Avicennia schaueriana*, 31.I.2010, leg. G.S. Nogueira-Melo et al. NM002 (URM 82146); Itamaracá, Manguezal do Canal de Santa Cruz, on live *A. schaueriana,* 25.VI.2009, leg. G. S. Nogueira-Melo et al. NM002, NM025 (URM 82134, URM 82138); on dead *A. schaueriana*, 10.III.2009, leg. G.S. Nogueira-Melo et al. NM001, NM004 (URM 82136, 82145); 26.VI.2009, leg. G.S. Nogueira-Melo et al. NM003, NM007, NM011 (URM 82144, URM 82143, 82137); 26.VII.2009, leg. G.S. Nogueira-Melo et al. NM002 (URM 82139); 22.VIII.2009, leg. G.S. Nogueira-Melo et al.NM006, NM012 (URM 82141, URM 82140); 17.I.2010, leg. G.S. Nogueira-Melo et al. NM002 (URM 82135); 19.III.2010, leg. G.S. Nogueira-Melo et al. NM004 (URM 82142).

Remarks: *Coriolopsis hostmannii* may be confused with *C. aspera,* which has similar hyphae and basidiospores. However, *C. hostmannii* has smaller pores (3–4 pores per mm in *C. aspera*) and smooth pilei. The zonate abhymenial surface may cause the species to be mistaken for *Funalia polyzona* (Pers.) Niemelä, although *Funalia* usually has a distinct variably zoned tomentum.

Coriolopsis psila (Lloyd) Ryvarden, **comb nov.**

Mycobank MB561160

≡ *Fomes psila* Lloyd, Syn. Fomes: 233 (1915). [BPI!].

≡ *Phylloporia psila* (Lloyd) Ryvarden, Norw. Jl Bot. 19: 235 (1972).

Basidiomata annual to perennial, sessile, solitary, sessile, pileus dimidiate to flabelliform, ≤ 6 cm in diam. and 2 cm thick with the tomentum, the latter as a dense mat of intertwined hairs in reddish brown colours, ≤ 1 cm thick. Context cigar brown (16) to umber (18), ≤ 4 mm thick in lower denser part, no black zone towards the cottony dense hair surface mat, tubes single layer or stratified as in the type, individual layer 3–4 mm thick. hymenial surface rusty-brown; dissepiments entire, relatively thick; pores round, 6–7 per mm, almost invisible to the naked eye. Hyphal system trimitic, generative hyphae often collapsed and difficult to observe, hyaline, thin-walled, but always with a distinct lumen often with secondary adventitious septa, ≤ 8 µm in diam., binding hyphae irregular in outline, frequently branched or with a few long tapering branches, thick-walled, yellow to light brown, ≤ 6 µm in diam. Basidiospores cylindrical, 9–12 × 3–4.5 um, hyaline, thin-walled and non-amyloid.

Ecology & Distribution: On deciduous wood. Known from Brazil and Mexico. The type locality in Brazil is not detailed but J. Rick, who collected the material, used to work in Rio Grande do Sul State, South Brazil. If so, it is probably a new occurrence for the Brazilian Amazonia and Northeast Brazil.

Specimens examined: **BRAZIL**. **Amazonas**: Manaus, 20.IV.1985, leg. M.A. Jesus 709 (INPA 185947, as *Perenniporia* sp.); 2.V.1990, leg. M.A. Jesus 1384 ([NPA 192652, as *Microporus* sp.); Manicoré, 20.IV.1985, leg. K.F. Rodrigues 233 (INPA 128955, as *Polyporus* sp.); **Bahia:** location not determined, date not determined, leg. C. Torrend (O 10486); Gongogi, V.1910, leg. C. Torrend, s.n. (URM 8893, as *Trametes ocellata* Berk. & M.A. Curtis); **Rondônia**: location not determined, 21.IX.1980, leg. B. Lowy et al. 230 (INPA 185947, as *Perenniporia* sp.); 20.V.1987, leg. M. Capelari et al. (SP 212021).

Extralimital specimen examined: **MEXICO**. **Oaxaca**: Tehuantepec, 13.VI.1976, leg. A.L. Welden 3606 (O 10488).

Remarks: *Coriolopsis psila* is a conspicuous species due the dense thick mat of entangled reddish brown hairs covering the pileus. Superficially it reminds one of *H. hydnoides*, which, however, has black and stiffer hairs on the pileus. Basidiospores of the two species are similarly cylindrical, but those of *H. hydnoides* are longer (12–14 µm). The generic concepts among polypores with a trimitic hyphal system producing white rot (*Coriolopsis*, *Hexagonia, Pycnoporus, Trametes*) are unclear and are based in part on basidioma color, a character of dubious value at the generic level. Further DNA sequencing will reveal the true phylogeny within these genera. For the time being we place *F. psila* in *Coriolopsis* due to its brown context and a spore length that is closer to other *Coriolopsis* species than in *Hexagonia*.

The combination in *Phylloporia* was based on the presence of a black line between the hairy cover of the pileus and context, a prominent character for

Phylloporia species. However *Phylloporia* was later characterized by small ellipsoid basidiospores and a parasitic life strategy (Wagner & Ryvarden 2002), while *C. psila* is saprophytic and has larger basidiospores. Seemingly a biological convergent character, the hairy pilear covering occurs in many polypore genera and is apparently an adaption to resist drying.

Key to the species of *Coriolopsis* recorded in Brazil

1a. Basidiomata mostly sessile 2

1b. Basidiomata mostly effused-reflexed 5

2a. Pores 1–4 per mm 3

2b. Pores 6–7 per mm 4

3a. Abhymenial surface finely tomentose at the margin, pores angular, 1–2 per mm, basidiospores not known . . . . . *C. burchellii*

3b. Abhymenial surface with scrupose tuft of agglutinated hairs, pores round, 3–4 per mm, basidiospores cylindrical 9–16 × 3–5 µm . . . . . *C. aspera*

4a. Abhymenial surface glabrous, basidiospores 8–10 × 2.5–4 µm . . . . . *C. hostmannii*

4b. Abhymenial surface with a dense mat of intertwined hairs, basidiospores 9–12 × 3–4.5 µm . . . . . *C. psila*

5a. Basidiospores oblong ellipsoid to subcylindrical, 10–14 × 4.5–6 µm, hyaline to very pale yellowish . . . . . *C. byrsina*

5b. Basidiospores ellipsoid to cylindrical, fusiform, hyaline, 7–11(–14) × 2–4 µm 6

6a. Context distinctly duplex, tobacco-brown and shiny. . . . . *C. floccosa*

6b. Context mostly homogeneous, dark brown to bay and dull 7

7a. Context distinctly darker than the tubes, hymenial surface bay to deep brown, pores round to angular, (2–)4–5 per mm . . . . . *C. brunneoleuca*

7b. Context dark date-brown concolorous with tubes, hymenial surface ochraceous, to cinnamon to deep chocolate brown, pores round, 3–5 per mm . . . . *C. caperata*

Acknowledgments

We would like to thank Dr. YC Dai and Dr. P. Buchanan for critically reviewing this manuscript; Ana Cristina R. Souza, curator of the HFSL, for support during the field trips of ACGS; Carlos Franciscon, curator of INPA and Adriana Gugliotta, curator of SP, for the loan of exsiccates; Aníbal Alves de Carvalho Júnior for support during the visit to RB; the staff of the ECFPn and of the MPEG for support during the field trips of PSM and TBG; and the Programa de Pesquisa em Biodiversidade (PPBio) da Amazônia for support during the field trips of PSM. Further, we acknowledge the Conselho Nacional de Desenvolvimento Científico (CNPq) for the master scholarship of ACGS, GSNM and PSM; the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (Capes) for the doctorate scholarship of ACGS; the Instituto Internacional de Educação do Brasil

(IEB) and the Gordon and Betty Moore Foundation for the Scholarship of Studies on Amazonia Conservation (BECA) to ACGS, PSM and TBG; the Dottorato di Ricerca in Ecologia Sperimentale e Geobotanica (Università degli Studi di Pavia, Italy), the Pós-Graduação em Biologia de Fungos (UFPE, Brazil), the Instituto Nacional de Ciência e Tecnologia - Herbário Virtual de Plantas e Fungos (CNPQ 573883/2008-4) and FACEPE (APQ 0433-2.03/08) for partially financing this study.

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